DOCKETED	
Docket Number:	11-AFC-04
Project Title:	Rio Mesa Solar Electric
TN #:	233566
Document Title:	Applicant's Supplemental Response to Data Request 16 and 26 Additional Information Regarding Paleontological Resources
Description:	Document was on proceeding webpage and is now moved over to the docket log.
Filer:	Marichka Haws
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/19/2020 3:39:56 PM
Docketed Date:	6/19/2020

APPLICANT'S SUPPLEMENTAL RESPONSE TO DATA REQUEST 16 AND 26: ADDITIONAL INFORMATION REGARDING PALEONTOLOGICAL RESOURCES

In this section of Applicant's Supplemental Response to CEC Staff Data Requests 16 and 26, Applicant describes the changes to the Paleontological Resources section that will result from the changes to the Project Description relating to the removal of Unit 3. Per staff's request, Applicant uses a strike-out/underline format to identify changes to the Paleontological Resources section of the Application for Certification that will result from the changes to the Project Description.

The Paleontological Resources sub-sections that have been modified are listed in the table of contents below. If there has been no change to a Paleontological Resources sub-section relating to Applicant's Supplemental Response to Data Request 16 and 26, the section is labeled "no changes" in the table of contents below.

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5.8 PALEONTOLOGICAL RESOURCES

5.8.1 Introduction (see Section 2.1.1 for updated for updated project description)

5.8.2 Laws, Ordinances, Regulations, and Standards

5.8.2.1 Federal

National Environmental Policy Act of 1969

NEPA establishes a public, interdisciplinary framework for Federal agencies reviewing projects under their jurisdiction to consider environmental impacts. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

The BLM, as lead Federal agency for the Project, is responsible for preparation of an Environmental Impact Statement (EIS) in compliance with NEPA to evaluate the environmental impacts of the portions of the Rio Mesa SEGF on federal lands. ~~The Rio Mesa Solar III plant and the~~ Portions of the Project gen-tie line, upgraded Bradshaw Trail access road, and 33kV construction/emergency backup power supply line are located on public lands administered and managed by the BLM. NEPA compliance is required for ~~this~~these portion~~s~~ of the Project ~~through preparation of a Draft and Final EIS~~. The Applicant anticipates that BLM may consider RMS 1 and 2 as a connected action under NEPA. BLM is also responsible for Native American consultation, including government to government consultation regarding project facilities on BLM land.

Antiquities Act of 1906 (no changes)

Federal Land Policy Management Act of 1976 (no changes)

Paleontological Resources Preservation Act of 2009 (no changes)

5.8.2.2 State (no changes)

5.8.2.3 Local (no changes)

5.8.3 Affected Environment

5.8.3.1 Geographic & Physiographic Setting

The Project is located in the Palo Verde Mesa, above and east of the Palo Verde Valley, an area on the west bank of the Colorado River in eastern California (see Figure 5.8-1 (rev)). The Mule Mountains are to the west and the Palo Verde Mountains are to the south and southwest. Some references consider the Palo Verde Mesa to lie within the Colorado Desert physiographic province; others consider it to lie within the Mojave Desert physiographic province. The salient difference between the two is that the Mojave Desert is high desert, whereas the Colorado Desert is low desert (Norris and Webb, 1990). Given that the

elevation of the Project varies from 310 to 660 feet above mean sea level (amsl), for the purposes of this document, the Project is considered part of the Colorado Desert physiographic province.

The Palo Verde Mesa is a nearly continuous terrace on the north and west sides of the Colorado River between the southern limit of the Big Maria Mountains and the east piedmont of the Palo Verde Mountains.

The legal description of the land administered by BLM on which the generator tie-line (gen-tie line) will be located is:

> *Portions of Sections 7, 8, 9, 15, 16, 17, 22, 23, 26, and 35, Township 07 South, Range 21 East, San Bernardino Meridian, Riverside County, California.*
>
> *Portions of Sections 2, 11, 13, 14 and 15, Township 08 South, Range 21 East, San Bernardino Meridian, Riverside County, California.*

The legal description of the private lands under lease from the MWD on which the balance of the Rio Mesa SEGF facility will be located is:

> *All of Section 28 and portions of Sections 15, 16, 20, 21, 22, 23, 27, 29, 33, and 34, Township 08 South, Range 21 East, San Bernardino Meridian, Riverside County, California.*

Four additional features, consisting of linear corridors used for site access and electrical service lines, also are part of the Project. For purposes of defining the approximate ROW for each 200-foot corridor, the areas extending 100 feet on either side of centerline are included in the ROW descriptions. The legal descriptions of the land on which these four linear features will be located are as follows:

Bradshaw Trail Access Road Corridor:

> *Portions of Sections 12 through 15, Township 08 South, Range 21 East, and portions of Sections 7 and 18, Township 08 South, Range 22 East, San Bernardino Meridian, Riverside County, California.*

33 kV Service Line Corridor New ROW:

> *Portions of Sections 12 through 14, 22, and 23, Township 08 South, Range 21 East, San Bernardino Meridian, Riverside County, California.*

33kV Service Line Corridor Existing ROW Overbuild:

> *Portions of Sections 3 through 10, 17, and 18, Township 08 South, Range 22 East, San Bernardino Meridian, Riverside County, California.*

34th Avenue Access Road Corridor:

> *Portions of Sections 23 through 27, Township 08 South, Range 21 East, San Bernardino Meridian, Riverside County, California.*

~~The Project lies in T8S, R21E, Sections 2, 3, 10, 11, 14-17, 19-23, 26-29, and 33-35. The power transmission line proposed as part of the Project crosses parts of Sections 7-9, 15-17, 22, 23, 26, and 35, T7S, R 21E.~~ The Project footprint lies on the Roosevelt Mine, Ripley, Thumb Peak, and Palo Verde 7.5' USGS topographic quadrangles (see Figure 5.8-2 (rev)).

5.8.3.2 Geologic Setting (no changes)

5.8.4 Resource Inventory (no changes)

5.8.4.1 Resource Inventory Methods (no changes)

5.8.4.2 Paleontological Resource Assessment Criteria (no changes)

5.8.4.3 Resource Inventory Results

Geologic mapping of the project area has not been performed in great detail. Jennings (1977) mapped the entire state of California at a scale of 1:250,000. Metzger et al. (1973) mapped the geology of the Palo Verde Mesa at a scale of 1:125,000. Jennings (1967) mapped the Needles 30' by 60' quadrangle at a scale of 1:100,000. Stone (1990) mapped the Blythe 30' x 60' quadrangle at a scale of 1:100,000, and Stone (2006) mapped the west half of the Blythe 30' by 60' quadrangle at the same scale.

Jennings (1967) mapped the sediments of the Palo Verde Mesa as Qc and Qal (Pleistocene nonmarine deposits and Quaternary alluvium). Metzger et al. (1973) mapped them as QTa and Qa (older alluviums and younger alluvium). Jennings (1977) mapped them as Qoa and Qal (older Quaternary alluvium and Quaternary alluvium). Stone (1990) mapped them as QTa (alluvial fan and fluvial deposits) and Stone (2006) mapped them as Qpv (alluvial deposits of Palo Verde Mesa).

According to Metzger et al. (1973), the Palo Verde Mesa consists of five alluviums (units A through E). Unit B (subsurface) has Pliocene roundstone gravels of exotic provenance. The rounded pebbles and cobbles of the Pliocene unit B are polymineralic. They are composed of various sedimentary, metamorphic, and igneous rock types.

Literature on the geology of the mesa indicates that the part at and near the surface has been treated differently by various authors. All, however, agree that the lower Colorado River underwent an atypical period of deposition of fine-grained sediments at that time (late Pleistocene). Metzger et al (1973) divided the uppermost (aboveground) strata of the Palo Verde Mesa into units D and E. They considered units D and E to be roughly equivalent to the Chemehuevi Formation, although not of lacustrine origin. Unit D they defined to include a basal gravel layer overlain by characteristic muds. They designated very late Pleistocene terraces incised into unit D as unit E.

Howard and Malmon (2008) recognized the Chemehuevi Formation (in their usage, equivalent to unit D of Metzger et al. 1973) and late Pleistocene terrace gravels that formed when the river re-incised into the Chemehuevi Formation (presumably equivalent to unit E of Metzger et al. 1973) include elements from the nearby Pliocene conglomerate. Their term for these is young terrace gravels. In the Applicant's analysis, they are designated young terrace sediments, because they are not always comprised of gravel.

Lundstrom et al. (2008) studied the fine grained sediments of the lower Colorado River and did not use the term "Chemehuevi Formation" to describe any of those sediments because of the variety of meanings that have accompanied that term. They found that up to 15 meters of coarse sand, rounded exotic gravel, and angular, locally derived gravel disconformably overlie more than 15 meters of finely bedded reddish mud, clay and silt. This is consistent with the observations of URS paleontologist on the Palo Verde Mesa.

A records search obtained from SBCM (contained within Appendix 5.8B) indicated that no vertebrate paleontology localities were known within several miles of the Project footprint. A search of the database of the University of California Museum of Paleontology (UCMP) produced two records of Pleistocene tortoise specimens recovered from the site of the Blythe Energy Center west of Blythe and northeast of the project area. The geologic unit that produced them is listed as Chemehuevi Formation.

A field survey for any visible fossil remains within the proposed project site and a one-mile radius was conducted from March 1 to June 17, 2011, by Joe D. Stewart (URS paleontologist), Michael Williams (URS paleontologist), Scott Musick (URS paleontologist) and Marjorie Hakel (Manpower paleontologist). See Appendix 5.8C for resumes. A search was performed for exposures of sediment appropriate for producing fossils. During the field survey, attempts were made to detect the presence and nature of subsurface native sediments. Areas of younger alluvium were not surveyed [it has low sensitivity for paleontological resources according to SVP Guidelines (1995)]. A separate field program to recover the specimens and associated data began on July 6, 2011, and ~~is ongoing~~ended September 1, 2011.

During the paleontological field survey of the project site, a widely distributed paleosol (fossil soil) developed on Colorado River silts, sands, and gravels was encountered. Some horizons of the paleosol produced hundreds of vertebrate fossils. The surface of the paleosol usually shows polygonal joints (Figure 5.8-3). These are the surface manifestation of the prismatic soil structure. Near the top of the paleosol, the joints are irregular, sporadic, or absent. The paleosol is sandy and less consolidated near the top, but more consolidated lower down. It consists of silt, sand, slight amounts of clay, and scattered gravel and cobbles. Calcium carbonate nodules occur near the base of the paleosol. The current mesa surface, where not covered by desert pavement, is deflating through this paleosol. The sediments beneath the paleosol are usually uncemented alluvium, often quite loose, and erode quite quickly when not protected by carbonate horizons.

Also present in the western part of the project site are alluvial fans issuing from the Mule Mountains. Where post-Pleistocene erosion has developed washes on the Mesa surface, modern (Holocene) wash sediments are present. Holocene eolian sands form irregular drifts on the paleosol surface.

The Colorado River abandoned the Palo Verde Mesa by early Holocene times. Up to 40 m of Holocene alluvium underlie the historic floodplain of the Lower Colorado River (Lundstrom et al. 2008). These sediments make up most of the cultivated land in the area between Palo Verde Mesa and the Colorado River. Three radiocarbon dates from these sediments are 8,610, 6,250, and 5,380 yr before present (BP) (Metzger et al. 1973). This recent alluvium is the sediment on which most agriculture land use along the lower Colorado River takes place.

A geologic map of the project area is provided in Section 5.4 of this AFC (see Figure 5.4-1). The following information combines the 2011 and 2012 survey results to generate totals and tables that include paleontological resources finding for the complete project area. In summary, there are now a total of 809 vertebrate fossils collected within the project area (see Table 5.8-2).

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
Resources Within the Direct APE		
242	?plant impressions preserved in caliche	MWD
247	2 bone fragments	MWD
254	tortoise fragment with sulcus	MWD
255	bone or ivory splinter	MWD
275.1	lizard vertebra	BLM
275.2	Iguandidae vertebra	BLM
275.3	*Dipsosaurus* vertebra	BLM
275.4	*Dipodomys* deserti L dentary	BLM
275.5	*Sylvilagus* L upper incisor	BLM
275.6	rodent tooth	BLM
275.7	*Dipodomys* deserti palate	BLM
275.8	rodent incisor, acid corroded	BLM
275.9	?rodent metapodial	BLM
275.11	*Dipodomys* desert R femur	BLM
275.12	?rodent metapodial	BLM
275.13	*Sylvilagus* bachmani R illium	BLM
275.14	*Lepus californicus* L femur	BLM
275.15	reptile vertebra	BLM
275.16	reptile vertebra	BLM
275.17	bird tarsometatarsus	BLM
275.18	bird tarsometatarsus juvenile	BLM
275.19	bird tarsometatarsus juvenile	BLM
275.21	*Sylvilagus bachmani* R manus radius and ulna	BLM
275.22	*Sylvilagus* L pes, astragalus, and calcaneum	BLM
275.23	juvenile rabbit jaw	BLM
275.24	*Sylvilagus bachmani* dist end L ulna	BLM
275.25	rodent upper incisor	BLM
275.26	rabbit Lp3	BLM
275.27	*Dipodomys* tooth	BLM
275.28	*Sylvilagus bachmani* L tibia & astragalus	BLM
275.29	*Dipodomys deserti* L calcaneum	BLM
275.31	*Sylvilagus* L calcaneum juvenile	BLM
275.32	*Gopherus* eggshell fragments	BLM
275.33	bufonid radio-ulna	BLM
275.34	*Sylvilagus* R radius	BLM
275.35	*Sylvilagus bachmani* prox R radius	BLM
275.36	miscellaneous bones & fragments	BLM
275.37	teeth & dentary fragment	BLM
275.38	*Dipodomys* Rp4	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
275.39	reptile vertebra	BLM
275.4	*Dipodomys* L dentary	BLM
275.41	reptile vertebra	BLM
275.42	reptile vertebra	BLM
275.43	lizard vertebra	BLM
275.44	heteromyid R incisor	BLM
275.45	heteromyid R incisor	BLM
277.1	*Lepus* calcaneum & metapodial and misc. associated bone fragments	Private
277.2	*Gopherus* eggshell fragment	Private
278	rabbit skeleton	Private
282	bone fragments	BLM
284.1	ungulate tooth fragment	BLM
292.1	*Gopherus* eggshell fragment	BLM
292.2	*Crotalus* vertebra	BLM
292.3	lepidosaur limb bones	BLM
292.4	rabbit upper cheek tooth	BLM
292.5	rabbit upper cheek tooth	BLM
292.7	mammal metapodial	BLM
292.8	rabbit ulna	BLM
292.9	fused metapodials	BLM
292.11	tiny mammal humerus	BLM
292.12	odd bone	BLM
293.1	rabbit radius	BLM
293.2	rabbit metapodial	BLM
306.1	*Gopherus* eggshells	BLM
306.2	*Gopherus* eggshells	BLM
307.1	*Gopherus* eggshells	BLM
307.2	*Gopherus* majority of shell & misc bone fragment	BLM
308	*Gopherus* eggshell fragment	BLM
309	6 tortoise fragments	BLM
310	shaft of hollow bone w	BLM
311	2 elongate bone fragments	BLM
312	bone fragment	BLM
313	tortoise fragment	BLM
315	2 *Gopherus* eggshell fragments	BLM
316	*Gopherus* eggshell fragments	BLM
317	ivory fragment	BLM
318	2 bone fragments	BLM
319	ivory?fragment	BLM
320	thin layer of bone	BLM
321	enamel fragment	BLM
338	rabbit skull	BLM
344	*Gopherus* sp peripheral	BLM
346	numerous ivory fragments	BLM
348	tortoise fragment w	BLM
349	tortoise fragment; large mammal bone	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
	fragment	
367	*Gopherus* eggshell fragments	BLM
370	mammal bone fragment	BLM
373	bone fragment	BLM
375	bone fragment	BLM
376	bone fragment	BLM
377	*Gopherus* epiplastron, entoplastron, and hypoplastron	Private
378	two tortoise fragments	BLM
379	artiodactyl phalanx	BLM
380	tortoise peripheral	BLM
381	tortoise peripheral, two tortoise fragments, and a bone fragment	BLM
382	*Gopherus* hypoplastron fragment	BLM
382.2	tortoise costal	BLM
386	bone fragment	Private
387	*Gopherus* (three pieces); anal portion of xiphiplaston?	BLM
389	tortoise fragment	BLM
390	*Gopherus* L epiplastron	BLM
391	tortoise costal	BLM
392	bone fragment	BLM
394	bone splinter	BLM
395	bone splinter	BLM
396	ivory? 4 rectangular bone fragments	BLM
397	2 tortoise fragments	BLM
398	numerous bone fragments	BLM
399	*Taxidea* skull & mandibles	BLM
400	bone fragment	BLM
401	bone fragment	BLM
402	bone fragment	BLM
403	proximal end of mammalian metapodial	BLM
404	bone fragment	BLM
412	elongate piece of bone	BLM
413	bone fragment – possible ?ivory	BLM
414	bone fragment	BLM
415	?ivory fragment	BLM
418	2 inch rounded mammal bone w/ separate metapodial /proximal	BLM
420	white bone fragment	Private
421	tiny bone fragment	Private
422	5 tortoise fragments	Private
424	*Gopherus hyoplastron*? fragment	Private
429	artiodactyl phalanx	BLM
434	*Gopherus* L anterior hyoplastron (male)	BLM
435	tortoise shell fragment	BLM
438.1	*Gopherus* upper costal fragment	Private
439	*Gopherus* right hyoplastron? (of male)	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
451	bone fragment	MWD
455	*Lepus* tibia in 5 fragments	MWD
456	2 fragments of carnivore jaw	MWD
457	*Lepus* calcaneum	MWD
458	large mammal bone fragment	MWD
459	*Sylvilagus* tibia fragments	MWD
461	large curved mammal bone fragment	MWD
462	5 tortoise fragments including fragment of plastron	MWD
466	tortoise fragment	MWD
467	fish fin in six pieces (six fragments)	MWD
468	bone fragment	MWD
471	tortoise fragment	MWD
472	*Gopherus* peripheral	MWD
474	bone fragment	BLM
481	bone fragment	BLM
482	2 bone fragments	BLM
483	bone fragment	BLM
484	bone fragment	BLM
485	bone fragment	BLM
487	artiodactyl phalanx	BLM
488	bone fragment	BLM
490	bone fragment in two pieces	BLM
491	bone fragment	BLM
492	*Gopherus* right epiplastron & bone fragment	BLM
493	3 bone fragments	BLM
494	3 ?ivory fragments	BLM
495.1	small metapodial and bone fragment	BLM
495.2	tortoise costal	BLM
495.3	*Gopherus* hyoplastron	BLM
495.4	*Gopherus* hypoplastron (female)	BLM
495.5	*Lepus californicus* calcaneum	BLM
495.6	artiodactyl astragalus	BLM
495.7	tortoise fragment	BLM
495.8	bone fragment	BLM
495.9	bone fragment	BLM
495.11	bone fragment	BLM
495.12	bone fragment	BLM
495.13	tortoise fragment and bone fragment	BLM
495.14	bone fragment	BLM
495.15	tortoise fragment	BLM
495.16	bone fragment	BLM
495.17	bone fragment	BLM
495.18	bone fragment	BLM
495.21	tortoise fragment and bone fragment	BLM
495.22	tortoise fragment	BLM
495.23	bone fragment	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
495.24	2 bone fragments	BLM
495.25	2 bone fragments	BLM
495.26	tortoise fragment and bone fragment	BLM
495.27	partial phalanx	BLM
495.29	bone fragment	BLM
495.31	bone fragment	BLM
495.32	bone fragment	BLM
495.33	2 bone fragments	BLM
495.34	bone fragment	BLM
496	turtle limb bone	BLM
497	2 bone fragments ?tortoise	BLM
498	rabbit calcaneum and bone fragment	BLM
499	bone fragment	BLM
500	mammal enamel	BLM
501	rabbit calcaneum	BLM
502	artiodactyl humerus	BLM
503	*Lepus* humerus	BLM
504	*Gopherus* peripheral	BLM
505	tortoise plastron fragment	BLM
506	2 tortoise fragments	BLM
507	*Gopherus* R epiplastron, gular area (male?)	BLM
508	?fragment of partly eroded bone or permian	BLM
509	small tortoise fragment and 2 bone fragments	BLM
510	*Gopherus* R tip of gular projection	BLM
511	hollow bone shaft	BLM
512	large mammal jaw fragment	BLM
513	artiodactyl carpal or tarsal	BLM
514	tortoise piece and bone fragment	Private
519	small tortoise fragment	Private
521	medium sized mammal radius	BLM
522	bone fragment	BLM
523	tortoise costal	BLM
524	2 bone fragments	MWD
525	bone fragment	MWD
526	small fragment of tortoise	MWD
527	large tortoise peripheral and bone fragment	MWD
528	tortoise fragment and bone fragment	MWD
529	tortoise fragment and bone splinter	MWD
530	tortoise fragment	MWD
531	bone fragment	MWD
533	2 bone fragments	MWD
534	broken bone fragment	MWD
535	2 bone fragments	MWD
536	bone fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
537	bone fragment	MWD
538	3 bone fragments	MWD
539	bone splinter	MWD
540	bone fragment	MWD
541	bone fragment	MWD
541.2	2 tortoise fragments	MWD
542	bone fragment	MWD
544	bone fragment	MWD
545	2 bone fragments	MWD
546	?tortoise fragment	MWD
547	tortoise fragment	MWD
548	tortoise fragment and bone fragment	MWD
549	tortoise fragment	MWD
550	bone splinter & large cancellous bone fragment	MWD
551	?skull fragment and other bone fragments	MWD
552	tortoise fragment and bone fragment	MWD
553	bone fragment	MWD
554	bone fragment	MWD
556	bone fragment	MWD
557	bone fragment	MWD
558	bone splinter	MWD
559	odd bone fragment	MWD
560	bone fragment	MWD
561	moderate bone fragment	MWD
562	tooth fragment	MWD
563	3 bone fragments	MWD
564	2 bone fragments	MWD
565	5 bone fragments	MWD
566	bone splinter	MWD
568	bone fragment	MWD
570	3 tortoise fragments/plastron	MWD
571	?ivory	MWD
572	tortoise fragment	MWD
573	bone fragment	MWD
575	large curved fragment of cancellous bone	MWD
576	tortoise fragment and bone fragment	MWD
577	tortoise fragment	MWD
581	tortoise and *Gopherus* eggshell fragments, & small bone shaft	Private
583	*Gopherus* costal broken, and fragments	MWD
585	*Gopherus* peripheral	MWD
586	tortoise fragment	MWD
587	*Gopherus* two carapace fragments	MWD
588	bone fragment	MWD
589	bone fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
590	numerous bone fragments	MWD
591	large bone fragment	MWD
592	small bone fragment	MWD
593	mammal tooth fragment	MWD
594	bone fragment	MWD
595	3 bone fragments	MWD
596	2 tortoise fragments	MWD
597	small mammal humerus	MWD
598	small bone shaft	MWD
599	tortoise fragment	MWD
600	*Gopherus* fragment	MWD
601	ivory?	MWD
602	bone fragment	MWD
603	ivory?	MWD
604	bone fragment	MWD
605	*Gopherus* eggshell fragment	MWD
606	*Gopherus* eggshell fragment	MWD
607	*Gopherus* eggshell fragment	MWD
608	2 bone fragments	MWD
610	bone fragment	MWD
611	bone fragment	MWD
612	*Gopherus* L hyoplastron	MWD
613	hollow bone shaft	MWD
614	3 tooth fragments	MWD
615	2 tortoise fragments	MWD
616	13 bone fragments	MWD
617	Large tortoise, (2) peripherals, right femur, ?vertebrae	BLM
618.1	bone fragment	BLM
618.2	2 bone fragments and 1 tortoise fragment	BLM
619	bone fragment	BLM
624	7 small bone fragments	Private
625	ivory fragment?	MWD
626	bone fragment	MWD
627	tortoise fragment	MWD
628	?tortoise fragment	MWD
630	4 bone fragments	MWD
632	tortoise fragment	MWD
633	bone fragment	MWD
634	3 tortoise fragments/?plastron	MWD
635	tooth fragment and bone fragment	MWD
636	tooth fragment and bone fragment	MWD
637	tortoise fragment	MWD
638	3 tortoise fragments	MWD
639	tortoise fragment	MWD
641	bone fragment	MWD
642	ivory fragment in two pieces	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
643	tortoise fragment	MWD
644	bone fragment	MWD
645	2 bone fragments	MWD
646	bone fragment	MWD
647	bone fragment	MWD
648	hollow bone shaft	MWD
649	*Gopherus* eggshell fragment	MWD
650	*Gopherus* eggshell fragment	MWD
651	3 *Gopherus* eggshell fragments	MWD
652 (137)	2 *Gopherus* eggshell fragments	MWD
653	2 *Gopherus* eggshell fragments	MWD
654	3 bone fragments	MWD
655	3 tortoise costals and a tortoise limb bone	MWD
656	Mammal tooth fragment	MWD
657	2 bone fragments	MWD
658	2 bone fragments	MWD
659	bone fragment	MWD
660	? ivory fragment	MWD
661	bone fragment	MWD
662	bone fragment	MWD
663	bone fragment	MWD
664	odd bone fragment	MWD
667	100 + tortoise fragments	Private
669	bone fragment	Private
670	Gopherus partial tortoise; parts of 2 vertebrae & numerous shell fragments	Private
671	bone fragment	Private
672	2 bone fragments; ?bird	BLM
677	bone fragment	BLM
678	bone fragment	BLM
679	?ivory fragment	Private
680	bone fragment	Private
681	tortoise fragment	Private
682	mammal acetabulum?	Private
683	*Lepus californicus* calcaneum	Private
684	odd small bone	Private
685	tortoise fragment	Private
688	small bone fragment	Private
690	cervid antler fragments	MWD
692	bone fragment	MWD
694	bone fragment	MWD
695	tortoise fragment	MWD
696	bone fragment	MWD
698	small bone fragment	MWD
699.1	partial tortoise skeleton	MWD
699.2	mammal bone fragment	MWD
699.4	?tortoise fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
700	2 mammal bone fragments	MWD
701	bone fragment	BLM
702	bone fragment	MWD
704	2 cervid antler fragments	BLM
705	5 bone fragments	BLM
706	bone fragment	BLM
709	2 tortoise fragments	BLM
710	bone fragment	BLM
712	hollow bone shaft	Private
713	bone fragment	Private
714	bone splinter	Private
715	?distal end of tibia of large artiodactyl?	Private
722	*Gopherus* eggshell fragment	MWD
723	bone fragment	MWD
725	bone fragment	MWD
726	bone fragment	MWD
727	2 small bone fragments	MWD
728	bone fragment	MWD
729	bone fragment	MWD
730	4 bone fragments	MWD
731	bone fragment	MWD
732	?ivory fragment	MWD
733	bone fragment	MWD
734.1	horse tooth fragment	MWD
734.2	horse tooth fragment	MWD
734.3	horse tooth fragment	MWD
735	*Gopherus* L epiplastron	MWD
736	small tortoise fragment	MWD
737	horse tooth fragment	MWD
738	bone fragment	MWD
739	?camel tooth fragment	MWD
740	bone fragment	MWD
741	bone fragment	MWD
742	bone fragment	MWD
743	bone fragment	MWD
744	*Gopherus* R gular	MWD
745	bone fragment	MWD
746	*Gopherus* peripheral and tortoise fragment	MWD
747	bone fragment	MWD
748	bone fragment	MWD
749	tortoise fragment	MWD
750	bone sliver	MWD
751	hollow bone shaft	MWD
752	fragment of ?tortoise	MWD
753	2 bone fragments	MWD
754	bone fragment	MWD
755	2 bone fragments	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
756	4 bone fragments	MWD
757	*Gopherus* L xiphiplastron	MWD
758	bone fragment	MWD
759	*Gopherus* R epiplastron	MWD
760	4 bone fragments	MWD
761	3 bone fragments	MWD
762	bone fragment	MWD
763	bone fragment	MWD
764	3 bone fragments	MWD
765	2 bone fragments	MWD
766	tortoise fragment	MWD
767	tortoise fragment	MWD
768	bone fragment	MWD
769	2 tortoise fragments	MWD
770	2 bone fragments	MWD
771	tortoise fragment	MWD
773	bone fragment	MWD
774	tortoise fragment and bone fragment	MWD
775	2 bone fragments	MWD
776	2 bone fragments	
777	tortoise fragment and bone fragment	MWD
778	bone fragment	MWD
779	bone fragment	MWD
780	bone fragment	MWD
781	small tortoise fragment	MWD
782	2 thick tortoise fragment	MWD
783	bone fragment	MWD
784	bone fragment	MWD
785	bone fragment	MWD
786	bone fragment	MWD
787	bone fragment	MWD
788	tortoise fragment	MWD
789	bone fragment	MWD
790	bone fragment	MWD
791	bone fragment	MWD
792	2 bone fragments	MWD
793	tortoise fragment	MWD
794	tortoise fragment	MWD
795	bone fragment	MWD
796	mammalian bone fragment	MWD
797	bone fragment	MWD
798	bone fragment	MWD
799	bone fragment	MWD
800	possible rabbit tibia? & tortoise fragment	MWD
801	tortoise fragment	MWD
802	bone fragment	MWD
803	2 tortoise fragments	MWD
804	tortoise fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
805	tortoise fragment	MWD
806	2 bone fragments	MWD
807	2 tortoise fragments	MWD
808	tortoise fragment	MWD
809	tortoise fragment	MWD
810	bone fragment	MWD
811	bone fragment	MWD
812	2 tortoise fragments and one bone fragment	MWD
813	bone fragment	MWD
814	tortoise fragment	MWD
815	tortoise fragment	MWD
816	ivory? fragment	MWD
817	tortoise fragment	MWD
818	tortoise fragment	MWD
819	tortoise fragment	MWD
820	bone fragment	MWD
821	bone fragment	MWD
822	tortoise fragment	MWD
823	bone fragment	MWD
824	*Gopherus* fragment	MWD
825	3 tortoise fragments	MWD
826	large tortoise fragment and small tortoise fragment	MWD
827	1 small and 1 large tortoise fragment	MWD
828 and 831	*Gopherus* left hypoplastron (828 and 831 fit together)	MWD
829	*Gopherus* ?plastral	MWD
830	tortoise fragment	MWD
831 and 828	*Gopherus* left hypoplastron (828 and 831 fit together)	MWD
832	tortoise fragment	MWD
833	tortoise fragment	MWD
834	tortoise fragment	MWD
835	3 tortoise fragments	MWD
836	*Gopherus* - large odd tortoise fragment	MWD
837	2 tortoise fragments	MWD
838	*Gopherus* R gular potion of epiplastron? & 2nd tortoise fragment	MWD
839	tortoise fragment	MWD
840	tortoise fragment	MWD
841	very thick tortoise fragment	MWD
842	very thick tortoise fragment	MWD
843	small tortoise fragment	MWD
844	tortoise fragment	MWD
845	tortoise fragment	MWD
846	tortoise fragment	MWD
847	two tortoise fragments	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
848	thick tortoise fragment	MWD
849	bone fragment	MWD
850	tortoise fragment	MWD
851	3 mammal tooth fragments	MWD
852	bone fragment	MWD
853	part of pelvic bone? and bone fragment	MWD
854	tortoise fragment	MWD
855	bone fragment	MWD
856	bone fragment	MWD
857	bone fragment	MWD
858	tortoise fragment	MWD
859	tortoise fragment	MWD
861	*Lepus californicus* calcaneum	MWD
862	bone fragment	MWD
863	2 bone fragments	MWD
864	bone fragment	MWD
865	tortoise fragment	MWD
866	2 tortoise fragments	MWD
867	bone fragment	MWD
868	tortoise fragment	MWD
869	tortoise fragment and bone fragment	MWD
871	bone fragment	MWD
872	2 tortoise fragments	MWD
873	tortoise fragment	MWD
874	tortoise fragment?	MWD
875	*Gopherus* tortoise fragment	MWD
876	tortoise fragment	MWD
878	tortoise fragment	MWD
879	bone fragment	MWD
880	femur and bone fragment	MWD
883	tortoise fragment	MWD
884	tortoise fragment	MWD
886	bone fragment	MWD
887	bone fragment	MWD
888	bone fragment	MWD
889	tortoise fragment	MWD
890	bone fragment	MWD
891	tortoise fragment	MWD
892	2 bone fragments	MWD
893	2 tortoise fragments	MWD
894	tortoise fragment	MWD
895	bone fragment	MWD
896	3 tortoise fragments	MWD
897	3 bone fragments	MWD
898	tortoise fragment and bone fragment	MWD
899	tortoise fragment	MWD
900	2 bone fragments	MWD
901	tortoise fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
902	tortoise fragment	MWD
903	*Gopherus* L xiphiplastron	MWD
904	small bone fragment	MWD
905	small bone fragment	MWD
906	tortoise fragment	MWD
907	tortoise fragment	MWD
908	tortoise fragment	MWD
909	*Gopherus* fragment	MWD
910	tortoise fragment	MWD
911	4 small bone fragments	MWD
912	tortoise fragment	MWD
913	bone fragment	MWD
914	2 bone fragments	MWD
915	*Gopherus?* approximal R tibia	MWD
916	bone fragment	MWD
917	tortoise fragment	MWD
918	tortoise humerus or femur?	MWD
919	bone fragment	MWD
920	bone fragment	MWD
921	2 bone fragments	MWD
922	bone fragment	MWD
923	bone fragment	MWD
924	bone fragment	MWD
925	bone fragment	MWD
926	bone fragment	MWD
927	bone fragment	MWD
928	bone fragment	MWD
929	bone fragment	MWD
930	tortoise fragment?	MWD
931	bone fragment	MWD
933	tortoise ulna	MWD
934	bone fragment	MWD
935	tortoise shell fragment	MWD
936	1 bone fragment; 1 tortoise fragment	MWD
937	large bone fragment	MWD
938	tortoise? fragment	MWD
939	tortoise fragment	MWD
940	3 bone fragments	MWD
941	2 bone fragments	MWD
942	bone fragment	MWD
943	bone fragment	MWD
944	bone fragment	MWD
945	bone fragment	MWD
946	bone fragment	MWD
947	bone fragment	MWD
949	bone fragment	MWD
950	bone fragment	MWD
951	ivory? broken bone fragment	MWD

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
952	2 bone fragments	MWD
953	bone fragment	MWD
954	bone fragment	MWD
955	bone fragment	MWD
956	bone fragment	MWD
959	large bone fragment	MWD
960	bone fragment	MWD
961	bone fragment	MWD
962	bone fragment	MWD
963	bone fragment	MWD
964	4 bone fragments	MWD
966	large bone fragment (?ivory)	MWD
967	small bone fragment	MWD
968	complex bone fragment	MWD
969	bone fragment	MWD
970	*Gopherus* eggshell fragment	MWD
971	numerous *Gopherus* eggshells in situ	MWD
972	enamel fragment	MWD
973	*Gopherus* eggshell fragment in situ	MWD
974	5 bone fragments	MWD
976	tortoise fragment	MWD
977	?tortoise fragment	MWD
978	tortoise fragment	MWD
979	hollow bone shaft	MWD
980	?tortoise fragment	MWD
981	bone fragment	MWD
983	*Gopherus* peripheral	MWD
984.1	tortoise fragment	BLM
984.2	8 bone fragments	BLM
985	bone fragment	BLM
986	bone fragment	BLM
989	tortoise peripheral	Private
990	tortoise fragment	BLM
991	bone fragment	BLM
992	bone fragment	BLM
993	bone fragment	BLM
994	2 bone fragments	BLM
995	tortoise fragment	BLM
996	3 bone fragments	BLM
997	tortoise fragment	BLM
998	bone fragment	BLM
999	bone fragment	BLM
1000	tortoise fragment, bone fragment	BLM
1001	small tortoise costal	BLM
1002	bone fragment	BLM
1003	tortoise bridge peripheral	BLM
1004	bone fragment	BLM
1005	bone fragment	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
1006	bone fragment	BLM
1007	bone fragment	BLM
1008	tiny tortoise peripheral & 2 bone fragments	BLM
1009	3 bone fragments	BLM
1010	bone fragment	BLM
1011	bone fragment	BLM
1012	3 bone fragments	BLM
1013	partial vertebral fragment	BLM
1014	2 bone fragments	BLM
1015	large tortoise fragment	BLM
1016	bone fragment	BLM
1017	2 bone fragments	BLM
1018	tortoise peripheral & 2 bone fragments	BLM
1019	tortoise costal & bone fragment	BLM
1020	?tortoise peripheral	BLM
1021	bone fragment	BLM
1022	bone fragment	BLM
1023	3 tortoise fragments	BLM
1024	hollow bone shaft	BLM
1025	tortoise bridge peripheral	BLM
1026	tortoise nuchal?	BLM
1027	tiny tortoise peripheral	BLM
1028	tortoise fragment	BLM
1029	tortoise fragment	BLM
1030	*Gopherus* tortoise fragment	BLM
1031	large tortoise fragment	BLM
1032	3 tortoise fragments	BLM
1033	tiny phalanx	BLM
1034	tortoise fragment	BLM
1035	2 tortoise fragments	BLM
1036	3 bone fragments	BLM
1037	tortoise fragment	BLM
1038	bone fragment	BLM
1039	bone fragment and tortoise fragment	BLM
1040	?tortoise fragment and tubular bone	BLM
1041	bone fragment	BLM
1042	bone fragment	BLM
1043	tortoise fragment	BLM
1044	?tibia fragment; mammal	BLM
1045	2 tortoise fragments	BLM
1046	small tortoise peripheral	BLM
1047	Tortoise ?gular process of female	BLM
1048	tortoise fragment	BLM
1049	tortoise fragment	BLM
1050	bone fragment	BLM
1051	bone fragment	BLM
1053	tiny calcaneum & bone fragment	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
1054	tortoise fragment	BLM
1055	tiny phalanx	BLM
1056	tortoise fragment	BLM
1057	large mammal bone fragment	BLM
1058	tiny bone fragment	BLM
1059	bone fragment	BLM
1060	2 tortoise fragments	BLM
1061	tortoise fragment	BLM
1062	bone fragment	BLM
1063	tortoise fragment	BLM
1064	2 bone fragments	BLM
1065	bone fragment	BLM
1066	bone fragment	BLM
1067	tortoise plastral fragment	BLM
1068	*Gopherus* L peripheral from the anterior part of the inguinal notch	BLM
1069	*Gopherus* R hypoplastron	BLM
1070	bone fragment	BLM
1071	fragment of possible large ?mammal jaw	BLM
1072	tortoise fragment	BLM
1073	rodent tibia & rodent femur	Private
1074	*Sylvilagus* metapodial	Private
1076	artiodactyl phalanx	BLM
1077	tortoise fragment	BLM
1078	tortoise fragment	BLM
1079	tortoise fragment	BLM
1080	mammal petrosal	BLM
1081	large bone fragment	BLM
1082	bone fragment	BLM
1083	carnivore tooth fragment	Private
1084	*Lepus* calcaneum	Private
1086	tortoise fragment	Private
1087	tortoise fragment	Private
1088	acetabulum	Private
1094	tortoise peripheral	Private
1095	mammal tooth fragment – horse?	Private
1096	canine tooth	Private
1097	2 bone fragments	Private
1098	hollow bone shaft	Private
1099	large artiodactyl phalanx	Private
1100	1 broken bone fragment	Private
1101	tortoise plastral fragments	Private
1102	tiny phalanx	Private
1103	proximal end of artiodactyl phalanx	Private
1104	*Gopherus* peripheral L of nuchal	BLM
1105	*Sylvilagus* metapodial & bone fragment	BLM
1106	bone fragment	BLM
1107	tortoise fragment (repaired)	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
1108	bone fragment	BLM
1109	bone fragment	BLM
1110	tortoise costal fragment	BLM
1111	tortoise fragment	BLM
1112	rodent femur – *Dipodomys*?	BLM
1113	odd bone fragment	BLM
1114	large bone fragment	BLM
1115	2 tortoise fragments	BLM
1117	tortoise fragment	MWD
1118	moderate mammal bone fragment	MWD
1119	tortoise fragment	MWD
1120	large mass of eggshell	BLM
1121	bone fragment	Private
1122	small bone fragment	Private
1123	hollow bone fragment	MWD
1124	bone fragment	MWD
1127	horse upper tooth fragment	MWD
1129	bone fragment	MWD
1130	bone fragment	MWD
1131	bone fragment	MWD
1132	13 bone fragments	MWD
1133.1	2 heteromyid incisors & bone fragment	BLM
1133.2	bone fragment	BLM
1133.1	*Dipodomys?* calcaneum	BLM
1134	egg fragment and ?rabbit humerus	BLM
1135.1	*Lepus californicus* mandibles	BLM
1135.2	?amphibian	BLM
1135.3	*Chaeteodipus* or *Perognathus L dentary*	BLM
1135.4	*Dipodomys deserti* L dentary	BLM
1135.5	heteromyid incisor	BLM
1135.6	*Thomomys* 4th premolar	BLM
1135.7	rodent astragalus	BLM
1135.8	*Dipodomys deserti* proximal end of femur	BLM
1135.9	*Dipodomys deserti* proximal end of femur	BLM
1135.11	illium	BLM
1135.12	*Dipodomys deserti* proximal end of femur	BLM
1135.13	sciurid L dentary	BLM
1135.14	*Dipodomys deserti* molar	BLM
1135.15	lizard dentary	BLM
1135.16	snake caudal vertebra	BLM
1135.17	*Phrynosoma platyrhinos* L occipital horn	BLM
1135.18	*Phyllorynchus decurtatus* vertebra	BLM
1135.19	lizard vertebra	BLM
1135.21	snake vertebra	BLM
1135.22	snake vertebra	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
1135.23	snake vertebra	BLM
1135.24	*Dipodomys deserti* p4	BLM
1135.25	heteromyid incisor	BLM
1135.26	reptile vertebra	BLM
1135.27	*Gopherus* eggshell fragments	BLM
1135.28	colubride snake vertebra	BLM
1135.29	*Dipodomys deserti* palate L&R P4-M3	BLM
1135.31	*Dipodomys deserti* p4	BLM
1135.32	10 isolated *Dipodomys deserti* cheek teeth	BLM
1136.1	5 *Gopherus* eggshell fragments	BLM
1136.2	3 bone fragments	BLM
1137	*Lepus* calcaneum	BLM
1138	bone fragment	BLM
1139	*Gopherus* eggshell fragment	BLM
1140	2 tibiae	MWD
1141	?canine tooth	MWD
1142	tortoise fragment	MWD
1145	2 *Gopherus* eggshell fragments	MWD
1146	tortoise fragment	MWD
1147	bone fragment	MWD
1148	Tortoise fragment	MWD
1149	tortoise fragment	MWD
1150.1	*Lepus californicus* humerus, radius & ulna	MWD
1150.2	*Gopherus* eggshell fragments	MWD
1151	large egg in situ & fragment	MWD
1152	tortoise fragment	MWD
1154	Lepus? fused metapodial	BLM
1156	bone sliver	private
1157	4 bone fragments	private
1158	tortoise fragment	private
1159	bone fragment	private
1160	8 bone and 3 tooth fragments	private
1161	1 bone fragment	private
Resources Excluded From the Direct APE		
287	?ivory w/caliche	BLM
288	partial metapodial	BLM
289	rabbit cheek tooth	BLM
295	bone fragment	BLM
356	2 bone fragments	BLM
357	large curved mammal bone & bone fragment	BLM
416	3 bone fragments	Private
419	multiple *Gopherus* eggshell fragments	BLM
419.2	10 misc. bone fragments	BLM
433	bone fragment	BLM
673	bone fragment	BLM

Table 5.8-2
Findings Summary

Specimen Number	Description	Parcel Ownership
674	bone fragment	BLM
675	bone fragment	BLM
676	tortoise peripheral?	BLM
686	bone fragment	BLM
707	2 bone fragments	BLM
708	2 bone fragments	BLM
987	tortoise fragment	BLM
1089	bone fragment	Private
1090	tortoise fragment	Private
1091	large mammal bone	Private
1092	rodent metapodial? Modern?	Private
1093	several pieces of tooth enamel? Modern?	Private
1153	*Lepus* calcaneum	BLM
1155	bone fragment	County of Riverside

5.8.5 Environmental Analysis

This analysis recognizes seven geological units in the area of the proposed Project. These are Chemehuevi Formation equivalents; late Pleistocene sands, silts, and gravels; Palo Verde Mesa paleosol; alluvial fans; Holocene alluvium of the mesa; eolian sediments of the mesa; and alluvium of the current Colorado River floodplain. The following paragraphs provide the foundation for this determination.

- **Chemehuevi Formation equivalents**. The finely bedded reddish mud, clay and silt assigned to the Chemehuevi Formation by some authors are visible on the lower parts of the bluffs of the Palo Verde Mesa, but rarely occur at the surface within the Project footprint. A few exposures thought to be Chemehuevi Formation equivalents were encountered. They are probably present in the subsurface over much of the project site. Metzger et al. (1973) mention fossils of turtle, snake, lizard, bird, and proboscidian tusk from their Unit D near Ehrenberg, Arizona, about 25 miles from the project area. Bell et al. (1978) published uranium-thorium dates of 96,000 to 102,000 thousand years (ka) on proboscidean tusk for the Chemehuevi Formation. Lundstrom et al. (2008) reported dates of infrared stimulated luminescence dates of 41-59 (ka) for Chemehuevi equivalents in the Cottonwood Landing area of the Colorado River in southern Nevada. They also reported thermoluminescence dates of 56-79 ka for the same section. URS paleontologists found a large fin spine of a ray-fined fish in a wash below an area where the Chemehuevi Formation outcrops; it is assumed that the fossil comes from the Chemehuevi Formation equivalents. This is the first reported fish fossil found on the Palo Verde Mesa. Sensitivity rating in terms of the system proposed by SVP (1995): High. Sensitivity in terms of the PFYC system: 4b.
- **Late Pleistocene silts, sands and gravels.** Late Pleistocene silts, sands and gravels (overlying the Chemehuevi Formation equivalent) were laid down by the Colorado River over an erosional surface of the Chemehuevi Formation equivalent. They include exotic rounded cobbles reworked from a Pliocene conglomerate. Apparently aquatic ichnofossils occur in the lower parts; just

below the paleosol terrestrial ichnofossils may be seen. These sediments are of appropriate age and lithology to have significant paleontological resources, but there are, as of yet, no records of such. Sensitivity rating in terms of the system proposed by (SVP 1995): High. Sensitivity in terms of the PFYC system: 3b.

- **Palo Verde Mesa paleosol**. This paleosol is developed on sediments that were laid down by the Colorado River. It is an aridosol; there is no concentration of humic material in its upper horizon. The total depth is at least 12 feet. Within the paleosol are scattered clasts of local rocks as well as exotic rounded cobbles from the Colorado River. The middle part of the paleosol is characterized by prismatic structure because of desiccation cracks. This prismatic structure gives rise to a polygonal pattern on weathering surfaces of the paleosol (Figure 5.8-3). The prismatic part of the paleosol is ranges from approximately five and one half to seven feet thick where not reduced by erosion or deflation. Carbonate can be dispersed flecks, small hard carbonate clumps, even large hard carbonate clumps, or even plates. The carbonate deposition is usually heavier toward the base of the paleosol (Bk horizon). This more heavily calichified basal part has an approximate thickness of five feet. At the base of the paleosol in some localities, rhizoliths (former roots now preserved as carbonate sleeves) and invertebrate trace fossils extend into the unconsolidated sands. ~~More than~~Approximately 834 ~~650~~ vertebrate fossils have been recovered from this unit. Of these, only 791 are now within areas impacted by the project. The fossils usually have at least a thin coating of caliche, as do the pebbles, clasts, and cobbles. To date, fossil birds, snakes, lizards, *Gopherus* sp. (desert tortoises), *Sylvilagus* (cottontail), *Lepus* (jackrabbit), rodents, *Taxidea* (badger), probable bighorn sheep, deer, *Equus* (horse), and *Mammuthus* (mammoth) have been recovered from this paleosol. It should be mentioned that the only way that fossils of large vertebrates can be found in paleosols is if rodents or carnivores drag pieces of the skeleton into their burrows. The mammoth is represented only by ivory fragments (Figure 5.8-4). The deer is represented only by antler fragments. The horse is represented only by tooth fragments. The only organisms represented by associated remains are tortoises (Figure 5.8-5), rabbits, rodents, and a badger (Figure 5.8-6). Multiple partial eggs also have been found; one occurrence is a presumed clutch with multiple eggs. One of the *Gopherus* partial skeletons appears to be in a burrow filled with silt and sand. The burrow is dug into a much harder carbonate horizon. This occurrence demonstrates that that carbonate horizon predates the tortoise and its burrow. It should be noted that the paleosol is exposed at the desert floor over large areas of the Project. It is found on both sides of the road that parallels the southern border of the project, both sides of the road that parallels the Western Area Power Administration (WAPA) power line along the eastern part of the project, and along both sides of the proposed transmission line. It also underlies the entire "common area". Csliche horizons are quite visible in the roads at many points. The paleosol will be impacted by construction. Sensitivity rating in terms of SVP 1995: High. Sensitivity in terms of the PFYC system: 4a .

- **Alluvial fans.** This geologic unit consists of clasts of Precambrian granitic rocks from the Mule Mountains. Near the west edge of the project site, these can be cemented by heavy caliche. Sensitivity rating in terms of SVP 1995: Low. Sensitivity in terms of the PFYC system: 2.

- **Holocene alluvium of the mesa**. Large eastward-draining arroyos have cut through the paleosol and at least some of the late Pleistocene silts, sands, and gravels. These carry sediments reworked from the various geologic units upstream. There can be reworked fossils in this

alluvium, but they are of little significance. Sensitivity rating in terms of SVP 1995: low. Sensitivity in terms of the PFYC system: 2.

- **Eolian sediments of the mesa.** In many areas, the paleosol is obscured by drifting sand. This sand is reworked from Pleistocene sediments. The only fossils found in these drifting sands are reworked. Near the northwestern terminus of the proposed power transmission line are large areas covered by dunes. Sensitivity rating in terms of SVP 1995: low. Sensitivity in terms of the PFYC system: 2.
- **Alluvium of the current Colorado River floodplain**. The current flood plain of the Colorado River near the Project is used for agriculture. There are no reports of paleontological resources from these sediments, and they are generally too young to produce significant paleontological resources. Sensitivity rating in terms of SVP 1995: low. Sensitivity in terms of the PFYC system: 2.

5.8.5.1 Potential Impacts of Proposed Project Construction (no changes)

5.8.5.2 Potential Impacts of Proposed Project Operation (no changes)

5.8.6 Cumulative Effects (no changes)

5.8.7 Mitigation Measures (no changes)

5.8.8 Involved Agencies and Agency Contacts

No state or local agencies have specific jurisdiction over paleontological resources. In Riverside County, David L. Jones administers paleontological matters. Other agency contacts who will be involved in the Project are listed in Table 5.8-~~2~~3.

Table 5.8-3~~2~~
Agency Contacts

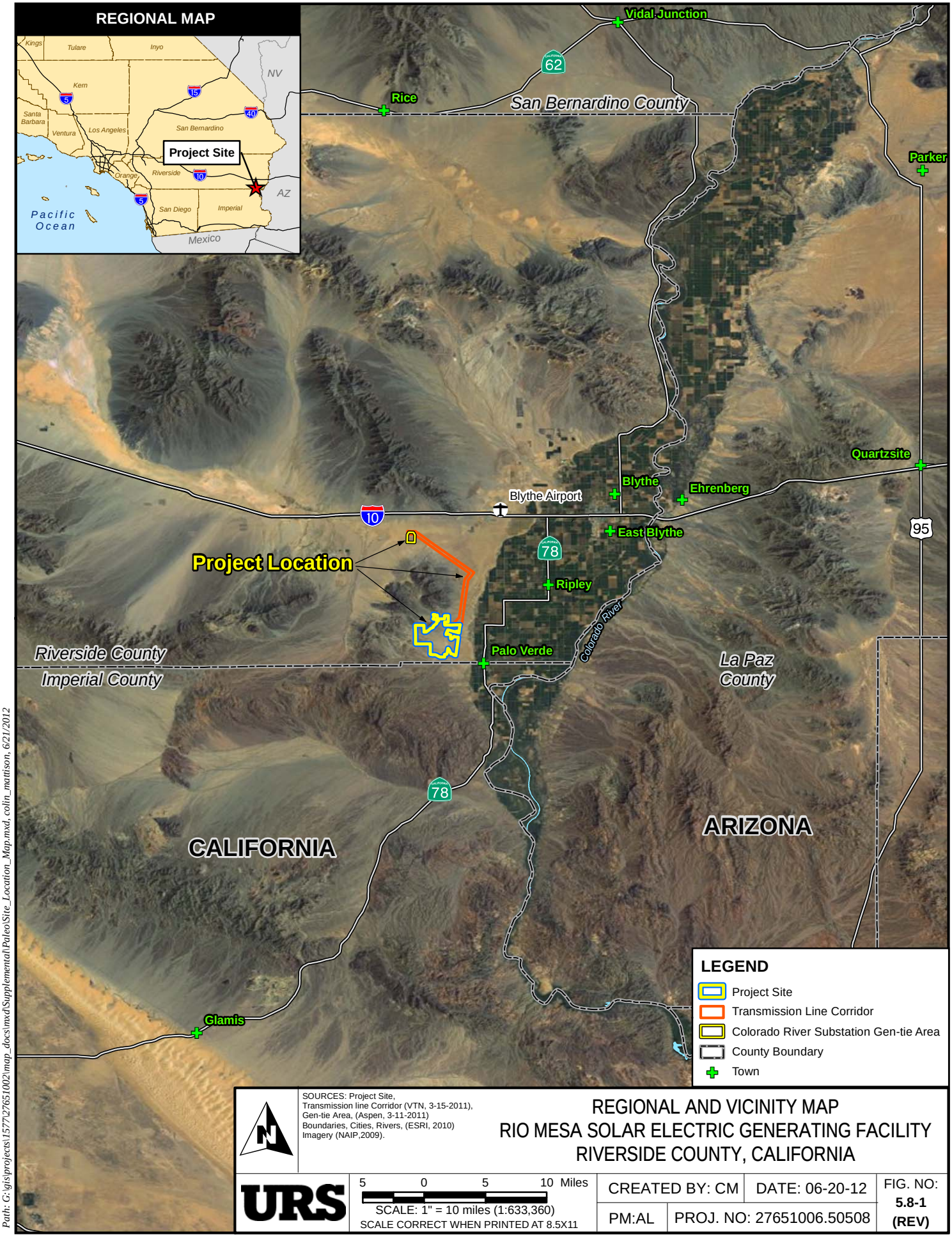
Agency Contact	Phone/E-mail	Permit/Issue
Sherrie Landon~~r~~ BLM Regional Paleontologist, Arizona, California and New Mexico 435 Montano NE Albuquerque, NM 87107	(505) 7661-8786 slandon@blm.gov	Preservation of Paleontological Resources
Dr. Charlotte Hunter BLM, California State Office State Lead, Archaeology, Paleontology, and Tribal Relations 2800 Cottage Way, W-1928 Sacramento, CA 95825	(916) 978-4648 cahunter@BLM.GOV	Fieldwork Authorization

Table 5.8-32
Agency Contacts

Agency Contact	Phone/E-mail	Permit/Issue
Cheryl Martinez Lands, Minerals, and Recreation Supervisor BLM Palm Springs-South Coast Field Office 1201 Bird Center Drive Palm Springs, CA 92262	(760)-833-7147 cmartine@blm.gov	Fieldwork Authorization
Rolla Queen District Archaeologist BLM California Desert District 22835 Calle San Juan de Los Lagos Moreno Valley, CA 92553	(95109) 697-5386 rolla.queen@blm.gov	Fieldwork Authorization
Tiffany Thomas Archaeologist BLM Renewable Energy CoordinatonCoordination Office 22835 Calle San Juan de Los Lagos Moreno Valley, CA 92553	(951) 697-5365 tathomas@blm.gov	Site Visit BLM locality form guidance
Paul Marshall Senior Engineering Geologist California Energy Commission 1516 Ninth Street Sacramento, CA 95814	(916) 654-4059 pmarshal@energy.state.ca.us	Evaluation of Application for Certification Paleontological Resources Section
Casey Weaver Engineering Geologist California Energy Commission 1516 Ninth Street Sacramento, CA 95814	(916) 654-4659 cweaver@energy.ca.gov	Site Visit and Guidance
Kathleen Springer Senior Curator San Bernardino County Museum 2024 Orange Tree Lane Redlands, CA 92374	(909) 307.2669, Ext. 242 kspringer@sbccounty.gov	Curation Agreement Site Visit
Eric Scott Curator San Bernardino County Museum 2024 Orange Tree Lane Redlands, CA 92374	(909) 307-2669, Ext. 241 escott@sbcounty.gov	Paleontological Records Search
David L. Jones Chief Engineering Geologist Planning Department Geology Division Riverside County 4080 Lemon Street Riverside, CA 92502	(951)-955-4004 djones@rctlma.org	Riverside County laws, ordinances, regulations and standards

5.8.9 Permits Required and Permit Schedule (no changes)

5.8.10 References (no changes)


REGIONAL MAP
Kings
Tulare
Inyo
NV
Kern
Santa Barbara
Ventura
Los Angeles
San Bernardino
Project Site
Orange
Riverside
San Diego
Imperial
AZ
Pacific Ocean
Mexico
Vidal Junction
62
Rice
San Bernardino County
Parker
Quartzsite
Blythe
Ehrenberg
Blythe Airport
10
East Blythe
95
78
Project Location
Ripley
Colorado River
Riverside County
Imperial County
Palo Verde
La Paz County
ARIZONA
CALIFORNIA
Glamis
LEGEND
Project Site
Transmission Line Corridor
Colorado River Substation Gen-tie Area
County Boundary
Town
N
SOURCES: Project Site, Transmission line Corridor (VTN, 3-15-2011), Gen-tie Area, (Aspen, 3-11-2011) Boundaries, Cities, Rivers, (ESRI, 2010) Imagery (NAIP,2009).
REGIONAL AND VICINITY MAP
RIO MESA SOLAR ELECTRIC GENERATING FACILITY
RIVERSIDE COUNTY, CALIFORNIA
URS
5 0 5 10 Miles
SCALE: 1" = 10 miles (1:633,360)
SCALE CORRECT WHEN PRINTED AT 8.5X11
CREATED BY: CM
DATE: 06-20-12
PM:AL
PROJ. NO: 27651006.50508
FIG. NO: 5.8-1 (REV)
Path: G:\gis\projects\27651006\map_docs\mxd\Supplemental\Paleo\Site_Location_Map.mxd, colin_mattison, 6/21/2012

Fenceline Boundary of Solar Field (3,805 acres) *Includes Common Areas, Switchyard and Gas Metering Yard
Common Areas Boundary (19.5 acres) *Included in Fenceline acres
Switchyard (2.47 acres) *Included in Fenceline acres
Gas Metering Yard (0.52 acres) *Included in Fenceline acres
Temporary Construction Logistics Area (103 acres)
Private Land Owned by MWD (approx. 6,741 ac.)
Private Lands within the Project (approx. acres: 67 T-line)
Private Lands within the Project - Right of Entry Obtained (approx. 386 ac.)
Bradshaw Trail Off Site
Existing Gas line (50ft. easement corridor, gas line is off-centered, 12.5ft. west of eastern easement boundary)
Proposed Project 230kV Transmission Line Corridor - (approx. 9.9 mi)
ROW Corridor approx. 1,641 ac. (1,300 ft. corridor, approx 650ft. from c/l; approx acres: 1196 BLM, 445 Private)
CRS Substation (77 ac.)
Colorado River Substation Gen-tie Area (approx. 114 ac.)
City/Town
County Boundary

Land Ownership

US Bureau of Land Management (2,598 ac.within project)
Unclassified (5,749 ac. within project)
PLSS Section Line
USGS 7.5-minute Quad

Mccoy Peak
Roosevelt Mine
Thumb Peak
Palo Verde Peak
Ripley
Palo Verde
Riverside County
Imperial County
Bradshaw Trail
22nd Ave
28th Ave
30th Ave
32nd Ave
34th Ave
Rannells Blvd
S. Neighbours Blvd
Existing Gas Line
Hodges Drain
Palo Verde Mesa
Palo Verde Valley
Nicholls Warm Springs
Radio Facility
Mountains
Lagoon
Colorado River

SOURCES:
Draft Solar Field Layout & Fenceline, MWD Land (Bechtel, 6-13-2012). Transmission Line Corridor (URS, 6-14-2012). Private Lands (BSE, 2012). CRS Substation, Potential Gen-tie Area (Power Engineers, 5-7-2012). County, State Boundaries, Roads, Bradshaw Trail (ESRI, 2007). Land Ownership (BLM, 3-03-2011). PLSS Sections (BLM, 12-11-2007). USGS 7.5-Minute Quadrangles (ESRI, 2007). USGS Quadrangle Boundaries (CDFG, 2000).

PROJECT FEATURES MAP
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

3000 0 3000 6000 Feet
SCALE: 1" = 6000' (1:72,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 06-20-12	FIG. NO: 5.8-2 (REV)
PM: AL	PROJ. NO: 27651004.00000	

Path: G:\gis\projects\15772765\1002\map_docs\mxd\AFC\Paleo\Supplemental\Project_Features_Map.mxd, colin_mattison, 6/21/2012, 2:15:43 PM